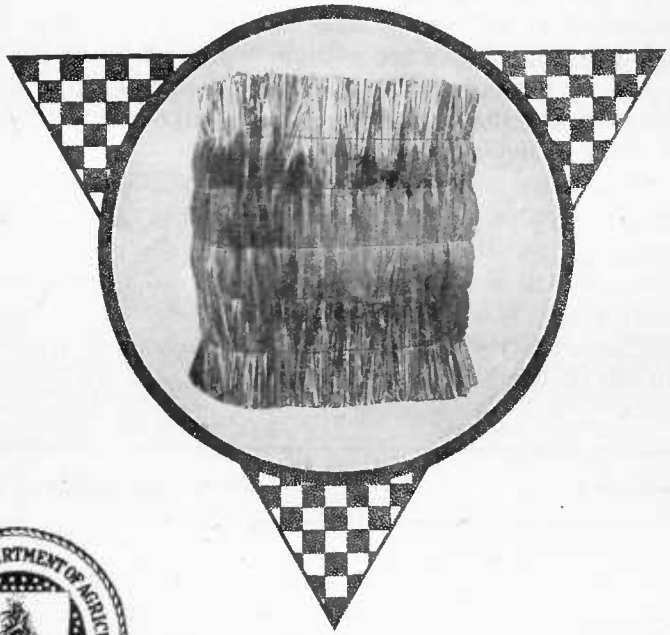
U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 958 Rev. Oct. 1923

STANDARD BROOM CORN



BROOM CORN is used in the manufacture of brooms and brushes; it has no other value. It will grow in some part of almost every State in this country, but brush of good quality can be produced only under favorable climatic conditions and the right sort of handling.

Broom corn belongs to the sorghum family and makes its best growth in a warm, sunny climate. The varieties are divided into two groups, the Standard and the Dwarf. The Dwarf varieties are adapted to the high altitudes and dry climate of the southern Great Plains States, and the Standard varieties to the humid conditions in the Eastern and the central Western States.

A well-prepared mellow seed bed, pure seed of high germinating power, and clean cultivation are essential to the production of the highest yield of good brush. The time of harvesting, the care exercised in thrashing, the method of curing, and the condition of the brush when marketed are important factors in determining its value.

The price of the brush is governed largely by quality and supply. The demand has been about constant for the past 20 years. When production exceeds the demand, the prices of all grades fall very low. When the crop is short, prices are much higher, sometimes reaching $400 or more per ton for brush of the best quality.

Washington, D. C. Issued May, 1918; revised April, 1923

STANDARD BROOM CORN.

By Benton E. Rothgeb,
Scientific Assistant in Grain-Sorghum and Broom-Corn Investigations, Bureau of Plant Industry.

CONTENTS.

NATURE AND USE.

BROOM CORN is grown only for the brush, which is used in the manufacture of brooms and brushes. Owing to its scant foliage, dry pith, and woody stalk, the plant has very little forage value. This applies especially to the Standard varieties. Because of these facts the value of the crop depends alone upon the market price of the brush. When the supply of brush is greater than the demand, the price falls below the cost of production, and when the crop is short and mostly of poor quality the price for good brush soars to almost prohibitive figures.

The price of broom corn is governed entirely by the domestic supply and demand. Only 1,000 to 2,000 tons are exported annually, and this small quantity does not affect the home market. The demand for brooms has remained about constant in the past 15 or 20 years, as vacuum cleaners and other devices of like nature have supplied the increased requirements for house cleaning, etc., due to the increase in population during this period. There is no apparent reason for a change in the demand for brooms in the near future; hence the demand for broom corn probably will remain unchanged.

HISTORY.

The origin of broom corn is not known. In Italy the growing of a sweet sorghum with a loose, open head for making clothes brushes dates back more than 350 years. It is likely, therefore, that broom corn is the progeny of a sorghum of this sort obtained through careful selection.

Broom corn has been grown in the United States at least since the year 1798. Until about 60 years ago New York and Virginia led in the growing of this crop; the production since then has moved slowly westward. In 1899 it centered in Illinois and adjacent States. Up to that time only the Standard broom corn was grown.

Within the 10 years from 1901 to 1910, Dwarf broom corn came into prominence, due to its adaptation to dry-weather conditions, and the center of production again moved westward, this time into Okla-

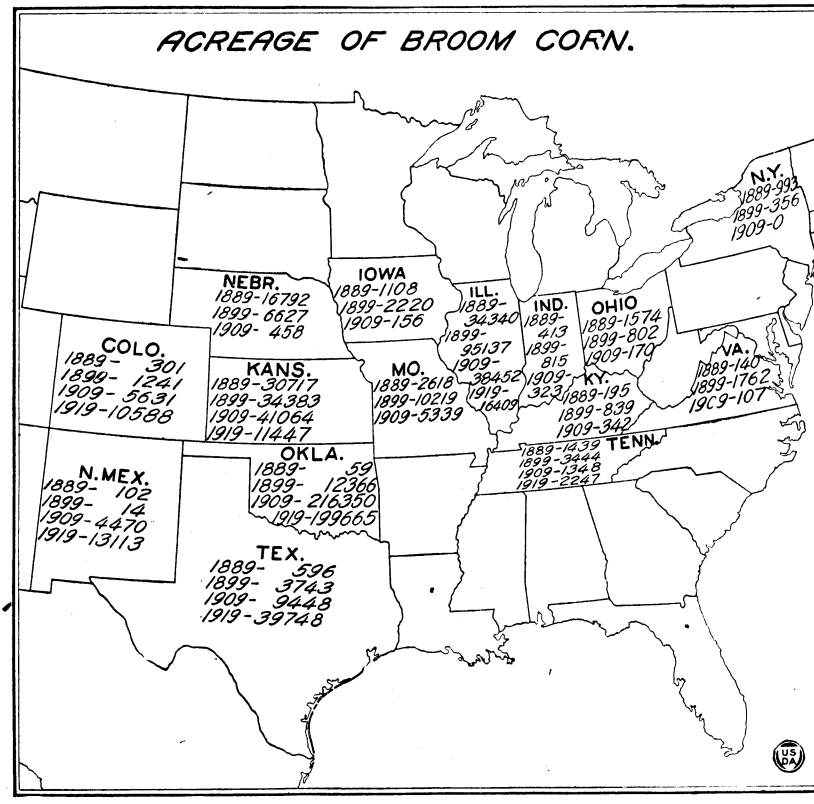


FIG. 1.—Outline map of the Central and Eastern States, showing the acreage of broom corn in each State in the years 1889, 1899, 1909, and 1919.

homa. The Standard variety is grown in the Lindsay district of Oklahoma and some Standard broom corn is grown in the vicinity of Elk City, but the remainder of the crop in the State is practically all of the Dwarf variety. The Lindsay district includes the bottom lands along the Washita River in Garvin, Grady, and McClain Counties. This district grew nearly 50,000 acres of broom corn in 1919 and produces a good grade of brush under normal conditions. The Lindsay brush has won an excellent reputation and is sought by manufacturers.

In 1919 Oklahoma had nearly 200,000 acres in broom corn and produced 29,828 tons of brush. This was nearly 67 per cent of the acreage and over 60 per cent of the total quantity of brush produced in the five leading broom-corn States that year. Texas, with 25,000 acres, took second place in acreage devoted to the crop, and Illinois was third, with 16,000 acres. New Mexico was fourth and Colorado fifth in point of acreage and production. Texas produced 3,900 tons, Illinois 4,400, and New Mexico 3,600 tons of brush. Illinois, therefore, ranks second in production and Texas third.

The acreage devoted to broom corn in the Eastern States has decreased in the last 20 or more years. A decided decrease took place in these States in the 10-year period between the 1899 and 1909 censuses. This is shown in Figure 1, which also shows the acreage of broom corn reported in the census of 1919.

CLIMATIC ADAPTATION.

Broom corn has a wide range of climatic adaptation, but grows best in a warm, sunny climate. It is more drought resistant or drought evasive than corn and can do better on a limited supply of water. Cool nights check the growth of broom corn, even when followed by days of moderate or intense heat. When grown under such conditions the fiber usually becomes coarse and brittle and is of poor quality.

This crop can be grown in almost every State in this country, but the best quality of brush is produced only under favorable conditions and with the right sort of handling at and following harvest. Dry, sunny weather at harvest time is favorable to curing the brush so that it will retain the natural green color. Excessive rain at this time is detrimental to color and quality, the brush becoming weather stained or red.

GROUPS OF BROOM CORN.

There are two chief kinds of broom corn, the Standard and the Dwarf. These differ mainly in the height of the plants and in the length and texture of the brush. Standard broom corn makes up about one-third of the total crop of this country at present. It grows from 8 to 14 feet in height, according to soil fertility and seasonal conditions. Normally the brush varies in length from 18 to 24 inches, and the head grows entirely out of the upper leaf sheath, or boot. The fiber usually is round and pliable but not as fine as that of the Dwarf variety. It is flat and coarse and of poor quality when produced under unfavorable conditions. Standard broom corn requires more water than the Dwarf and therefore is better suited to culture under humid conditions. This bulletin will be devoted to the culture of Standard broom corn, as Dwarf broom corn has been discussed in another publication.[1]

[1] Rothgeb, B. E. Dwarf broom corns. U. S. Dept. Agr., Farmers' Bul. 768, 16 p., 7 fig. 1916.

The Standard varieties grow taller than the Dwarf, and the main stem of the head, or brush, is more firmly attached to the upper joint, which does not permit the brush to be harvested by pulling or "jerking." The head not being inclosed in the upper leaf sheath, or boot,

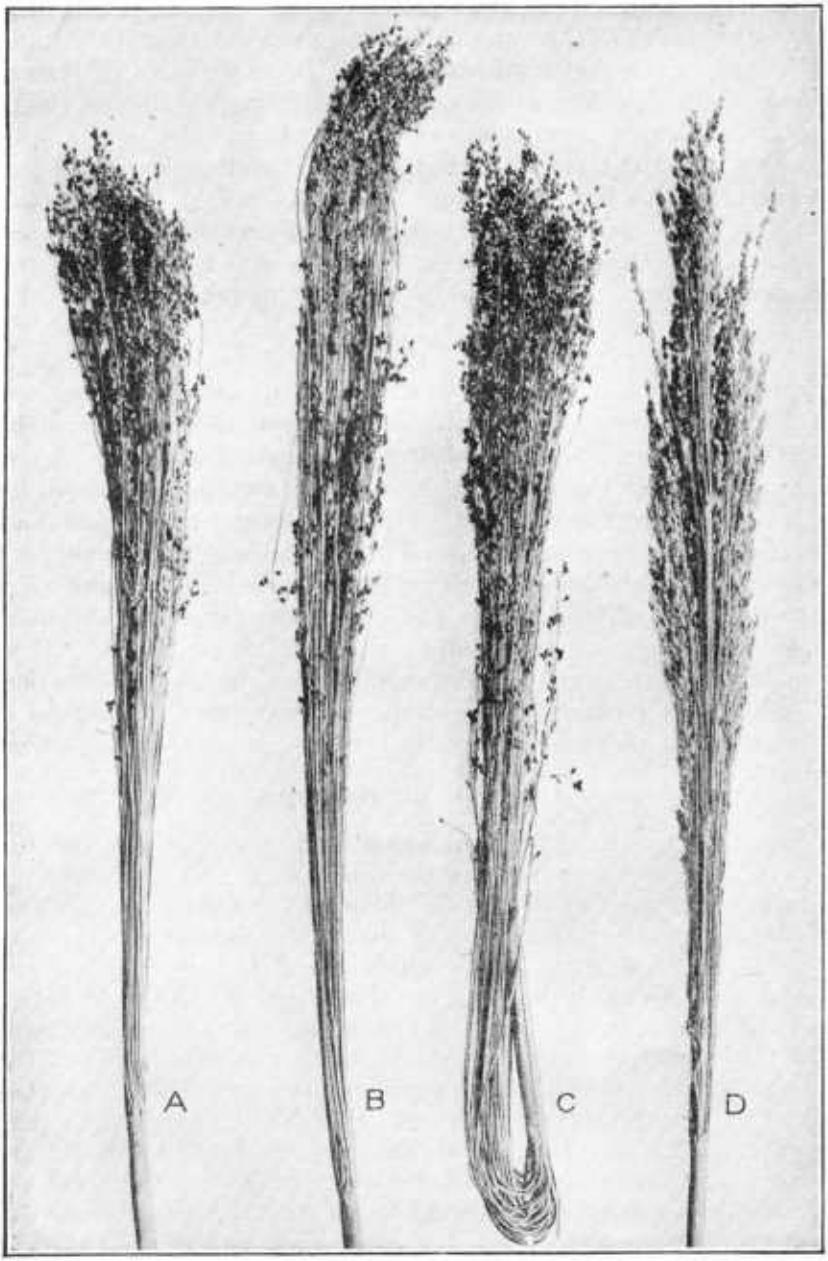


FIG. 2.—Heads of broom corn: (*A*) Good type, round fiber; (*B*) coarse, flat fiber; (*C*) crooked head; and (*D*) poor, short fiber and a large central stem.

does not permit water and plant lice (aphids) to accumulate there and damage the brush. For this reason the Standard varieties are better adapted to humid conditions.

Many varietal names have been applied to Standard broom corn. Some of these are Australian, Black Spanish, California Golden, Chinese Evergreen, Early Longbrush Evergreen, Evergreen, Imperial Evergreen, Improved Evergreen, Missouri Evergreen, and Tennessee Evergreen. These names are not very important, as they do not represent distinct varieties. In many cases they are local names. What the grower should know is whether he is getting seed of high germination, selected from brush of good quality. The manufacturer wants to know the quality of the brush he is buying, regardless of the name applied to it. Broom-corn heads of good and of poor quality are shown in Figure 2.

GROWING THE CROP.

Broom corn requires practically the same cultural treatment as other sorghums or corn. Like corn, it makes its best growth on rich friable soils. The cultural requirements depend largely upon the nature of the soil and the season. The crop should be given the treatment that has proved best for corn on the different soils in any given locality.

PREPARING THE SEED BED.

A well-prepared mellow seed bed is essential to success. This permits sowing the seed at a uniform depth. All the young plants will then emerge to a good stand at about the same time, and the brush will develop more uniformly.

The time and depth of plowing depend entirely upon the nature and condition of the soil. In east-central Illinois the most successful growers of broom corn use clover-sod land for this crop. The land usually is plowed in the fall but left without further treatment until spring. Then it is worked with disk and spike-tooth harrows into a deep, even seed bed. Shortly after sowing, but usually before the young plants emerge, a corrugated roller is run over the field. This pulverizes all the clods and breaks the surface crust. The land is then in good condition for further cultivation. This method of preparing the seed bed is applicable to other States with similar conditions and may be modified to meet emergencies.

GOOD SEED.

A good stand and a uniform crop are essential to the maximum yield of brush of good quality. These can be obtained only by using pure seed of high germination. The grower should know not only the quality of the seed, but also the kind and quality of brush from which the seed was thrashed. Broom corn crosses readily with

all varieties of sorghum. Seed from such crosses or hybrids produces worthless brush and should not be used.

Broom-corn seed is obtained commonly from three sources: (1) From growers who make a business of growing the seed for sale, (2) from the piles of seed which accumulate at the thrashers, and (3) from the field or seed plat of the grower or his neighbor. There are serious objections to the seed derived from the second source and sometimes objections to that from the first.

SEED FROM PRIVATE GROWERS.

Private growers who specialize in broom-corn seed usually produce seed of good quality from varieties or strains adapted to conditions under which the crop is grown. Most of these growers of the Standard variety are located in east-central Illinois, and this seed is very well adapted to the humid conditions of the Eastern and Southern States. The best results can not be obtained from seed when it is sown in a locality where the conditions are quite unlike those under which it was produced. Home-grown seed of good quality usually produces a better crop than imported seed of the same quality. Each farmer should grow his own seed or obtain it from some one in his locality who specializes along this line.

SEED FROM BROOM-CORN THRASHERS.

The broom-corn thrasher is unquestionably the most undesirable source from which seed may be obtained, as seed from all kinds and qualities of brush is mixed in thrashing. The seed from brush of good quality with round fibers can not be separated from that of poor quality with coarse, flat fibers, twisted and burly heads, and hybrids. No matter how carefully this seed is cleaned and graded by the use of a fanning mill, the good seed from desirable brush can not be separated from that from poor brush and hybrids. The brush is harvested somewhere between the flowering and dough stages, and the greater part of the seed is immature and will not germinate. It is not possible, therefore, to grow a crop of desirable brush from such seed.

Broom corn is subject to smut. When seed is obtained from unknown or mixed sources, the likelihood of getting smut-infested seed is very great. If smutted seed is sown, unless it is first treated to destroy the disease there is sure to be a large percentage of smutted heads in the resulting crop. This causes heavy loss to the grower, as smutted brush is of little or no value. The seed on good brush becomes infested also and endangers the future crop.

The kernel smut is the common smut of broom corn. It can be destroyed by the formaldehyde treatment of the seed, which is easily and cheaply applied. All seed not known to be free from smut should be so treated before it is used for sowing purposes. Directions for smut treatment are given on page 18.

SEED FROM A HOME SEED PLAT.

The home seed patch, if properly handled, is the ideal source for broom-corn seed. The grower can be absolutely sure of the quality of his seed from this source. He has as good seed as that produced by any commercial grower, and he eliminates the chance of getting poor, mixed seed from unknown sources.

The best seed obtainable should be used. As the plants approach the heading stage, all that are not true to the variety sown, as indicated by different heights, sizes, shapes, or colors, should be removed from a few rows on one side of the field. The remaining plants in these rows should be inspected frequently as the brush begins to emerge from the boot. All spiky brush, or that with a large central stem, should be removed before it flowers and cross-fertilizes the good brush. If this work is well done the first year, much less time will be required in the second and succeeding years.

SOWING THE SEED.

The main factors in sowing the seed are (1) when to sow, (2) how much to sow to the acre, and (3) how to sow.

WHEN TO SOW.

The time to sow broom corn differs with the locality and even within the same locality. Sowing should not be done too early. The seed does not germinate well in a cold soil, and a poor stand results.

The early crop of broom corn usually is sown in the Lindsay district in Oklahoma about April 15. In central Illinois sowing begins about April 25 if conditions are favorable and, if a large crop is sown, continues at 10-day intervals until finished. Thus the crop is not all ready to harvest at one time, which avoids loss from the brush becoming overripe before it can be harvested. How late in the year sowing may be delayed and the brush still mature depends upon weather conditions in the early fall. Growth is checked by cold nights, and a heavy frost will kill the plants. In localities where frosts are not likely to occur before about October 1, good crops sometimes are grown if sowing is delayed until July 1. Normally from 80 to 90 days are required for the brush to mature. More time is required to mature a seed crop.

HOW MUCH SEED TO SOW.

The rate of sowing broom corn depends largely upon the fertility of the soil and on seasonal conditions. From 2 to 3 pounds of good, clean seed are required to sow an acre where the rows are 3½ feet apart. This will produce an average stand of one plant in every 3 to 5 inches of row space. Sowing should be done at a heavier rate on rich soil than on poor soil. Thin stands on rich soils tend to produce long, coarse brush. Thick stands on poor soils may produce short brush or, in extreme cases, none at all.

HOW TO SOW THE SEED.

In districts growing Standard broom corn, except in the Lindsay district in Oklahoma, the seed usually is sown with an ordinary corn drill fitted with special plates. It may be either surface-sown or listed. The latter method is practiced almost exclusively in the Lindsay district. That method should be used which has proved best for other sorghums or corn in any given locality. The seed should be placed about 1 inch deep in a well-prepared moist seed bed. Deeper seeding may be necessary in dry soils.

Broom corn plates usually can be obtained from the manufacturer or the local implement house, or blank plates may be obtained and drilled by a blacksmith or by the farmer. The number and size of holes in the plate required to sow a given rate depend to some extent on the speed adjustment of the corn drill, which differs in the different makes. The speed adjustment of the drill to be used should be learned and the number of holes in the plate required for a given rate then determined. The holes should be not less than three-sixteenths of an inch in diameter and slightly countersunk on the under side, so that the seed will not wedge fast in the hole. Holes one-fourth of an inch in diameter are preferred by some successful growers. Seeding will have to be done at a heavier rate than the stand desired, because all of the seed will not germinate.

CULTIVATING.

Thorough cultivation is essential to the production of a full crop of good brush. The young plants grow slowly at first, and the crop will be seriously damaged if weeds are allowed to grow in large numbers. In fact, the total destruction of the crop may result if the weeds get an early start. Harvesting is made more tedious and expensive when the field is full of large weeds. Cultivation should be begun early and repeated often enough to destroy all weeds and to keep the soil in a loose condition, so that the rain will be absorbed readily and loss of moisture from "run-off" or injury to the crop by standing water will be reduced to the minimum.

The first cultivation should be given with either a corrugated roller or a spike-tooth harrow before the young plants have emerged. This will break the surface crust and permit the plants to emerge uniformly, and it will destroy young weeds which are appearing in the surface soil. The second cultivation should follow a few days after the crop is up, but before the plants are large enough for the work to be done satisfactorily with an ordinary cultivator. For this the spike-tooth harrow will be the most efficient. The harrow teeth should be slanted backward, so that they will not cut into the ground deep enough to injure the plants. Later cultivations may be made with the ordinary corn cultivator. Under normal conditions three such cultivations are sufficient. On land where weeds are bad more cultivations will be required. These should be as frequent as may be necessary to keep down the weeds and to keep the soil in good tilth. Cultivation should be continued until the plants are too large for the team and cultivator to pass between the rows without injuring the crop.

HARVESTING THE BRUSH.

The value of the brush depends largely upon the stage of maturity when harvested. If the brush is harvested when too young the fiber is weak at the base of the head, and when harvesting is delayed until the brush is overripe the fiber becomes hard and brittle. Good service can not be expected from brooms made of such brush.

WHEN TO HARVEST.

The brush should be harvested when it has reached the stage where the natural green color extends from the tip of the fiber to the base and center of the head. This usually occurs from the time when the flowers are falling to the time the seed is in the milk or thin-dough stage. Brush harvested in this stage and properly cured, without being damaged by the sun or wet weather, is tough and flexible and of the best quality.

If a seed crop is desired the brush is not harvested until the seed is fully mature. The value of ripe brush depends largely upon the climatic conditions previous to harvest and the care given the brush after the seed is removed. If seed brush is not discolored by wet weather, but has the natural yellow color of mature brush, it commands about half the price of good brush if cared for in the same way.

METHODS OF HARVESTING.

Standard broom corn and Dwarf broom corn are harvested in different ways. The Standard is bent over or tabled and the brush cut off; the Dwarf is jerked or pulled from the upright stalk.

The Standard varieties are so tall that the stalks have to be bent over to bring the brush within reach. This process is called tabling. The tabler walks between two rows, bending or breaking the stalks over, 3 or 4 feet from the ground. The stalks of the left-hand row are bent to the right and those of the right-hand row to the left. This crosses the stalks of these rows, so that a sort of table is formed behind the tabler, the brush projecting across the table into the spaces between this pair of rows and the next row on either side. A field of broom corn partly tabled, with the heads harvested and lying in bunches on the table, is shown in figure 3.

The brush is harvested by walking in the space between the tables and cutting the heads from the stalks with a jackknife or a knife with a short, wide blade made especially for that purpose. The stalk should be cut so as to leave about 6 inches of stem with the brush. All leaf sheaths, or boots, should be removed as the heads are cut. The knife should be held firmly with the cutting edge pointing at an angle from the body. If the head is then grasped with the other hand and the stalk pulled against the knife, instead of forcing the knife against the stalk, the stem of the brush will usually slip out of the boot as it is being cut from the stalk. As the heads are cut they are laid in handfuls on the table. The brush should be hauled to the curing shed and thrashed the same day it is harvested, or at any rate not later than the following day.

FIG. 3.—A field of broom corn, partly tabled, showing the harvested heads lying in piles on the table.

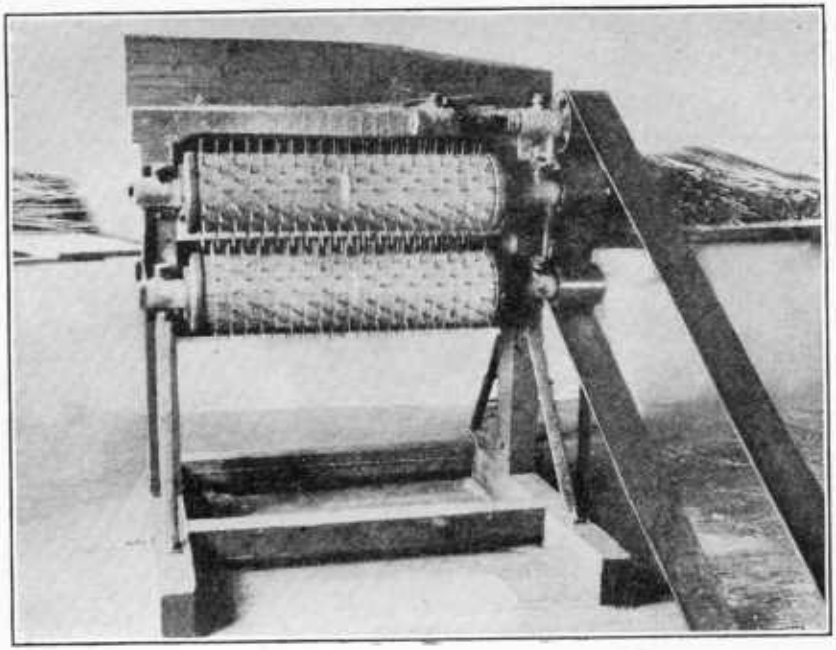


FIG. 4.—Rear view of a hand-fed broom-corn thrasher.

THRASHING.

The broom-corn thrasher, constructed especially for this crop, consists essentially of two horizontal cylinders, one about 3 inches above the other, revolving in opposite direction. The surfaces of both are set with teeth or spikes. The spikes project about $1\frac{3}{4}$ inches from the surface and are set 3 inches apart in rows 1 inch apart, running lengthwise of the cylinders. The spikes alternate in the rows running lengthwise, so that the rows around the cylinders are formed by the spikes of alternate rows running lengthwise.

There are now in common use two different makes of these thrashers, one hand fed and the other self fed. The main differences in these machines are the method of feeding and the capacity. In thrashing with the hand-fed machine, the feeder stands directly in front of the cylinder. The brush is grasped firmly by the stems at the base and the tips are inserted between the cylinders and held there until all the seed is removed. The brush is then withdrawn. A rear view of a hand-fed thrasher is shown in figure 4.

The heads are carried to the cylinders of the self-fed machine by a sprocket belt. This belt passes in front of the cylinders and parallel to them. It holds the heads firmly by the stems and is so adjusted that only the seed-bearing tips pass between the cylinders. The seed is stripped from the brush as it passes along to be deposited

on a table beyond the cylinders. The capacity of this thrasher is much larger than that of the hand-fed one, and more help is required to operate it. A view of a thrasher of this sort is shown in figure 5.

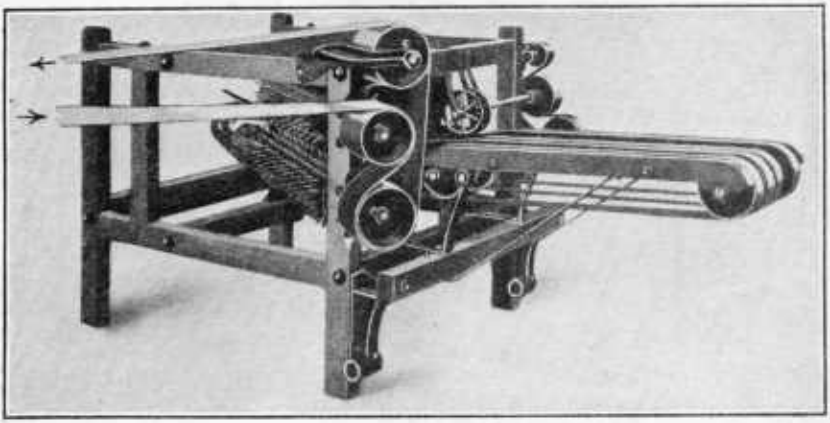


FIG. 5.—Side view of a self-fed broom-corn thrasher.

The hand-fed thrasher does as good work as the self-fed one, but is recommended for use only where small lots of brush are to be thrashed. Time saved in thrashing shortens the risk of exposure to damage by unfavorable weather conditions.

In thrashing broom corn all the seed should be removed from the brush, but as little as possible of the fine fiber should be torn off with the seed. For the best results the heads should be fed into the thrasher straight and in small handfuls. Otherwise a good job of thrashing can not be expected and the loss of fiber will be much greater.

CURING.

The value of the brush often is determined in the process of curing. Color and condition govern the price to a large extent. The highest quality of brush is obtained only when proper precautions are taken in curing it. It is essential that the brush be cured rapidly and not exposed to strong sunlight, in order to be in the best condition and retain the natural green color.

SHED CURING.

The best method of curing the brush, in sections where the Standard variety may be grown, is in a shed built for the purpose. About 1 cubic foot of space is required for each 2 pounds of cured brush. A shed 10 feet high, 16 feet wide, and 24 feet long will furnish ample space for green brush that will make about 3½ tons after curing. This is equal to the average yield of about 12 acres in the central Illinois district.

A curing shed need not necessarily be expensive. It consists chiefly of a framework of heavy studding 10 feet high to the plate, supporting a roof with widely projecting eaves. The gables are sheeted, but the sides and ends usually are left open to permit free circulation of air. Sometimes the end and side in the direction from which rains usually come are sheeted also to protect the brush, leaving a space near the ground for the circulation of air. In many cases the grower cures his brush in a wagon shed, cattle shed, or straw shed. These sheds are usually open on one or both sides, which permits the air to circulate but protects the brush from the sun and wet weather. The brush occupies the shed but a few weeks in autumn and leaves it available for other uses the remainder of the year. From two to three weeks are required for the brush to cure, depending on weather conditions.

The brush is cured in shallow layers spread on a series of shelves. For convenience in arranging these shelves the shed should be divided into sections about 8 feet wide by setting posts 8 feet apart in rows lengthwise of the shed. To these posts should be nailed strips of boards at least 1 inch thick and 2 inches wide, running crosswise of the shed. Beginning near the ground these strips should be placed 6 inches apart from center to center until the plate is reached.

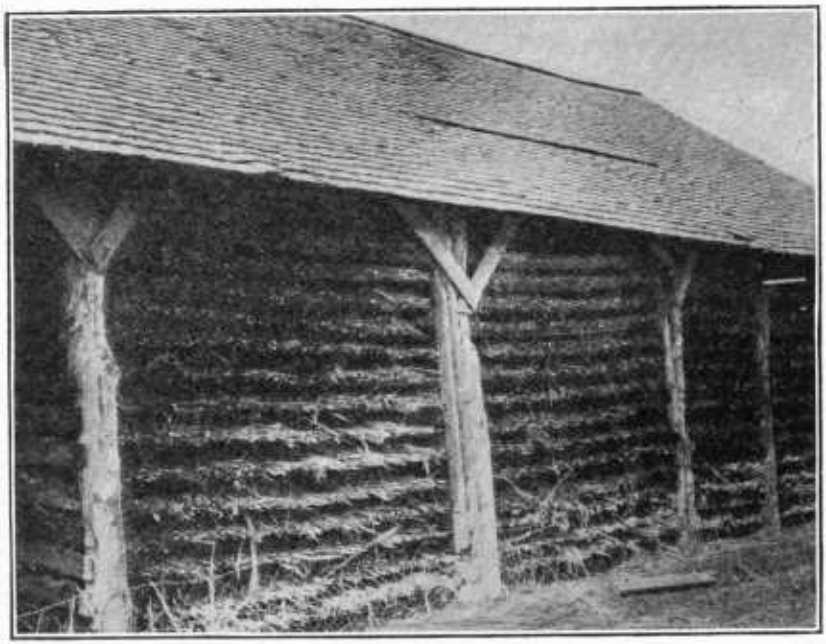


FIG. 6.—A curing shed filled with brush in the process of curing.

The shelves are formed by laying 2-inch slats in pairs with their ends resting on the cross strips. The members of each pair are placed just far enough apart to support the brush. The shelves are put in place only as fast as needed while filling the shed.

The brush is usually placed in the shed from one side only, in which case the first layer is placed at the bottom on the opposite side. The next layer is placed above the first and so on to the top until that section of the shed is filled. The brush should be spread evenly, not more than 2 or 3 inches deep on the shelves, so it will dry quickly. If the brush is placed too deep on the shelves it may become moldy and brittle while curing. A shed of brush in the process of curing is shown in figure 6.

If thrashing is done while the brush is green, fewer fine tips of the fiber are torn off with the seed than when thrashing is delayed until after the brush is cured. For the best results with the least risk of damage from wet weather, all brush harvested in any one day should be hauled to the shed before night. The following morning this brush should be thrashed and placed on the shelves to dry. If the brush is handled in this manner there will be no loss from weather-stained or sun-bleached brush.

PREPARING FOR MARKET.

The market value of the brush normally depends to a large degree upon its condition. Much of the season's profit may be lost by careless handling after the crop is cured. Careful grading, baling, and storing are important.

GRADING.

The brush should be graded before it is baled. Crooked heads, heads with twisted or burly fiber, and those with a large center stem are of poor quality and should be separated from the good brush. Grading can be done conveniently either when the brush is being taken from the field, after it is thrashed, or just before the baling is done.

The practice of baling the crop without grading is a common source of loss to the grower. Where good and poor brush are mixed, the buyer will estimate the percentage of poor brush a little higher than appearances indicate, in order to be on the safe side. The price paid under such circumstances usually is less than the total price the good brush and poor brush would have brought if baled separately. In most cases the grower will be well repaid for the time and labor devoted to grading his brush and baling each grade separately.

BALING.

The brush should be taken up in small armfuls and butted against a board, so that all the butts are even. It should then be placed in the baler, with the butts set firmly against the end of the baler. The butts of one armful are placed against one end and those of the next armful against the other end, continuing the process until the baler is full. The bale is then pressed into shape and the wires fastened. If the bale is pressed tightly and the wires properly adjusted, a good square bale will result. A well-made bale is shown in figure 7.

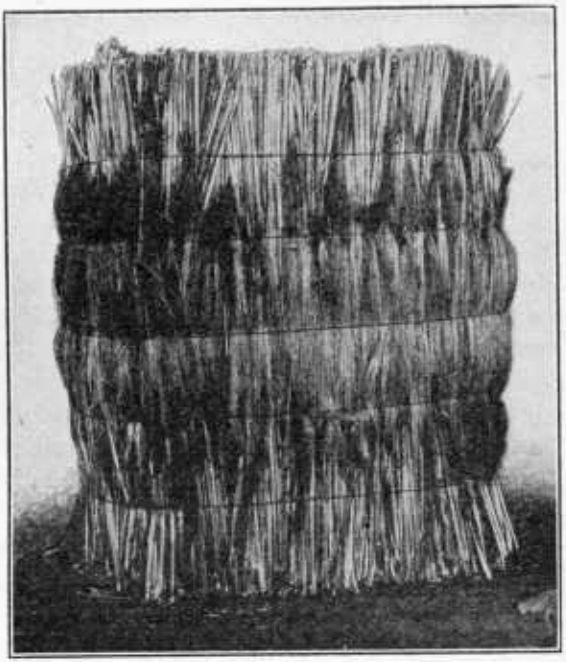


FIG. 7.—A well-made bale of broom corn.

Baling should not be done until the brush is dry enough to eliminate all danger of its molding in the bale. If baling is delayed indefinitely after the brush is dry, it should be bulked and protected from the light or it will bleach.

STORING.

The bales should be stored in a dry, dark place for protection from the weather and sunlight; otherwise the outside will be weather stained or bleached by the sun, and they will not bring as high a price as if kept in good condition.

DISEASES.

Smut is the common disease of broom corn. The crop is subject to two kinds of smut, the kernel smut (*Sphacelotheca sorghi*) and the head smut (*Sphacelotheca reiliana*).

The kernel smut is the more common of the two and may cause great loss if not kept under control. The kernels are replaced by black masses of smut spores, but the head retains its usual form

and almost its usual appearance. The fiber is brittle and of poorer quality than that from noninfested heads.

When the plant is affected with head smut, the whole head is converted into a large smut mass covered by a whitish skin or membrane. This membrane soon bursts and sets free the black mass of spores. The brush is an entire loss when this smut appears.

TREATMENT FOR SMUT.

Kernel smut can be destroyed by treating the seed with formaldehyde solution. Mix 1 pound of commercial formaldehyde with 30 gallons of water in a tub or barrel. Put the seed in sacks and soak in this solution for one hour, stirring it occasionally. Then drain the sacks and spread the seed on a clean floor or canvas to dry. The floor or canvas and the sacks into which the dried seed is put should be treated with the solution, as the seed will be infected again if any untreated smut spores touch it.

The solution may be used also as a spray. To use it in this way, spread the seed on a clean floor or canvas and sprinkle with the solution. The seeds must be stirred until all of them are wet. Shovel the seeds into a pile, cover with a treated canvas to keep in the fumes, and leave over night. In the morning spread the seeds out thinly to dry. The soaking or immersion method is more thorough, but perhaps not as convenient as the sprinkling method.

There is no known seed treatment effective against head smut. If possible, keep it off the farm. When it is present the diseased plants should be gathered and burned before the spores are scattered by the wind. This smut is not abundant except in certain small, unimportant districts.

PROFIT AND LOSS.

The profit or loss on a broom-corn crop depends, of course, upon the cost of production and the yield, quality, and market price of the brush. It is an expensive crop to produce, because of the large amount of labor required in the short time in which this work must be done and the special machinery required to handle the brush properly.

COST OF PRODUCTION.

The cost of producing a ton of brush has been placed at from $35 to $50 by successful growers in the States where most of the crop is grown. The expense varies in different localities, due to differences in land values and in the cost of labor. It costs little, if any, more under favorable conditions in a given locality to produce a good grade of brush than a poor one. The difference in price between good and poor quality will more than cover the added expense required to

produce good brush. The cost of the special machinery, such as the thrasher and the baler, may be much reduced to each grower if purchased in partnership by several. When labor is scarce, this problem may be partly solved by combining forces.

MARKETING.

The brush can be marketed to best advantage in carload lots, because of the difference between freight rates in full cars and smaller lots. The brush runs about 6 bales to the ton and from 10 to 12 tons to the carload. Community cooperation is needed to obtain the greatest success in growing broom corn. This will make possible marketing the crop is carload lots, with a consequent saving in freight. The manufacturers are more likely to send an experienced buyer into such a community, and it is possible for a community to grow a uniform grade of brush which will be recognized and sought at a premium by the manufacturer.

Good brush of uniform quality always brings a much higher price than poor brush. The prices on all grades vary widely in different years and sometimes in the same season, depending upon the quality and supply. When the production is large the price drops very low on all grades. Under such conditions the poorer grades may sell very slowly at from $20 to $25 per ton, while the better grades bring from $50 to $60 per ton. When there is a scarcity prices are much higher, sometimes reaching $400 or more per ton for the best brush. Normally the market price for good brush ranges from $75 to $100 per ton, but during the years 1916 and 1917 the price was much higher.

YIELD.

The yield of broom corn varies in the different States and in the same State in different seasons. Season, soil, and cultivation are important factors in this regard. When these factors are favorable the highest yield of good brush is produced.

During the last 30 years more than 93 per cent of the brush produced in the United States was grown in 16 States. Broom-corn production on a commercial scale was reported by the Bureau of the Census in only 7 States in 1919. The total production in the years 1889, 1899, 1909, and 1919 was 19,278, 45,475, 39,479, and 48,700 tons, respectively. Oklahoma now leads in production. In 1919 that State produced 29,828 tons, which was about 61 per cent of the total crop in that year.

The reports of the Bureau of Agricultural Economics show that Oklahoma, Texas, Illinois, Kansas, and New Mexico, in the order named, were the leading States in the production of broom corn in the years 1920 and 1921. The production of these 5 States was

34,400 and 35,600 tons, respectively, in these two years. About 30 per cent of this was of the Standard variety and the remaining 70 per cent of the Dwarf variety. In 1922 these 5 States produced 31,900 tons of broom corn, Illinois standing second in production.

USE AND VALUE OF THE STOVER.

Broom-corn stover consists of the stalks and leaves remaining after the brush is removed. This may be harvested and used either as silage or dry roughage, or it may be pastured. An economical way to dispose of the stover of the Standard variety, and the one commonly practiced, is to use it for pasture and later turn under as fertilizer what remains. Because of the tangled condition of the tabled stalks, harvesting the stover for feed is too laborious and expensive to be justifiable.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1923